one radical photoinitiator referring to column 17, lines 20-30 and at least one coloring agent referring to column 16, lines 15-60. The Examiner further characterizes the references as disclosing an ink having a viscosity of less than 50 mPas at 25°C (3-30 cps) referring to column 6, lines 19-27 and having a dispersible pigment as the coloring agent, referring to column 16, lines 10-67 and column 17, lines 1-20.

However, it is submitted that this is an inaccurate characterization of the disclosure of this reference. Thus, Claim 1 of the present application relates to an ink-jet ink which is substantially free of water, volatile organic solvents and multi-function (meth)acrylates and comprises at least one monofunctional (meth)acrylate monomer, at least one α, β-unsaturated ether monomer, at least one radical photoinitiator and at least one coloring agent. Furthermore, the ink is required to have a viscosity of less than 50 mPas at 25°C. The Examiner argues that such an ink is disclosed in this reference and refers, in particular, to the examples and the sections of the description that referred to mono-functional (meth)acrylate monomers, unsaturated ether monomers and photoinitiators. However, to the contrary, this reference does not disclose the inventive ink-jet ink recited in Claim 1. Thus, none of the examples can anticipate Claim 1 because none of them disclose an ink containing an α, β-unsaturated ether monomer.

At page 3 of the Office Action, the Examiner suggests that Table 7 discloses inks containing an α, β-unsaturated ether monomer, but this is incorrect.

An α, β-unsaturated ether includes the following moiety:

Not one of the solvents used in the examples of Ylitalo includes such a moiety.

Furthermore, Examples 3-6 of the reference all include a difunctional acrylate (HDDA and/or EBECRYL 284) which includes 12% hexanediol diacrylate and clearly do not fall within the scope of Claim 1. Additionally, none of the inks of Example 1 of the reference include a radical photoinitiator. Consequently, the inks which are exemplified in this reference do not anticipate Claim 1 as it stands.

While Ylitalo does mention vinyl ether monomers in a long laundry list of possible monomers that can be used, there is no specific disclosure of an ink that comprises at least an α, β-unsaturated ether monomer in combination with a monofunctional (meth)acrylate monomer and a radical photoinitiator and which further, is free of volatile organic solvents and multi-functional(meth)acrylates. In fact, at lines 42-57 of column 11 of the reference, Ylitalo indicates that many different multi-functional monomers can be used in the inks disclosed in the reference. Certainly, this does not point one with skill in this art to the specific composition presently claimed.

It should be further noted that Ylitalo is primarily concerned with providing ink-jet inks that exhibit excellent flow, adhesion, dot gain, compatibility, weatherability and curing characteristics. The reference teaches that such inks are achieved by including a volatile organic solvent component (see the Abstract, lines 55-61 of column 3, lines 49-52 of column 14 and Claim 1). Thus, the reference teaches that the presence of a volatile organic solvent is an <u>essential</u> feature of the invention of the reference. The only ink compositions disclosed in the reference that do not include a volatile organic solvent are in the comparative examples which do not anticipate Claim 1 because the inks disclosed therein do not include an α, β-unsaturated ether monomer. Accordingly, the rejection of Claims 1-7 and 9-14 as being anticipated by Ylitalo, et al. '753 is untenable and should be withdrawn.

Turning now to the rejection of Claim 8 as being obvious under 35 U.S.C. §103(a) over the combination of Ylitalo, et al. '753 taken with Roth '084, this rejection should also be withdrawn.

The inks recited in the present claims, and in particular Claim 8, are very low viscosity and can be used for printing on porous substrates, such as, paper and board. The combination of the two types of monomers means that it is unnecessary to include a volatile organic solvent in the ink in order to lower the viscosity. The disadvantages associated with the use of volatile organic solvents as discussed in the paragraph bridging pages 1 and 2 of the present application, can therefore be avoided. Moreover, an acceptable cure speed and adhesion to porous material can be achieved even in the absence of multifunctional (meth)acrylates when the recited combination of monomers is used. As discussed at page 2 of the present application, it was previously thought that multifunctional (meth)acrylates were required in order to provide good chemical resistance, fast curing speed and good adhesion. Since multifunctional (meth)acrylates are generally relatively viscous (see page 2, lines 18-20 of the present application), the use of this type of monomer in the inks provides the advantage of a very low viscosity product.

The combined teachings of Ylitalo, et al. and Roth contain no suggestion that a very low viscosity ink suitable for printing on porous substrates can be obtained by combining at least one monofunctional (meth)acrylate monomer and at least α, β-unsaturated ether monomer in the absence of water, a volatile organic solvent and multifunctional (meth)acrylates. Indeed, the Ylitalo reference teaches away from the present invention because the invention disclosed in Ylitalo is based on the realization that the addition of a volatile organic solvent can improve the ink properties, such as, the viscosity (see column 3, lines 55-67). The presence of a volatile organic solvent is an <u>essential</u> feature of the Ylitalo, et al. invention. Roth contains nothing which would lead one skilled in the art to omit the volatile organic solvent of the primary reference. In fact, column 12, lines 6-11 of Roth states that the solvent should be added to lower the viscosity if necessary. Consequently, the combined teachings of Ylitalo and Roth would lead one with skill in this art away from providing an ink comprising at least one monofunctional (meth)acrylate and at least one α, β-unsaturated ether monomer in the absence of water, a volatile organic solvent and multi-functional (meth)acrylates or expect that one could obtain a very low viscosity ink which can be printed onto porous

substrates. Consequently, the combination of these reference certainly do not disclose the composition recited in Claim 8 and the rejection is also untenable and should be withdrawn.

Turning now to the rejection of Claims 1, 2 and 7-14 as being obvious over the combination of Roth '084 taken with Marshall, et al. '646, reconsideration and withdrawal of this rejection are also requested. At page 5 of the Office Action, the Examiner suggests that Roth discloses an ink-jet ink which is substantially free of water, volatile organic solvents and multi-functional (meth)acrylates and which contains at least one unsaturated ether monomer, at least one radical photoinitiator and at least one coloring agent. Firstly, Roth simply does not disclose radical photoinitiators. As stated at lines 10-14 of column 9 of Roth, the photoinitiators disclosed therein are cationic photoinitiators and are distinguished from photoinitiators that generate free radicals.

Thus, in order to arrive at the present invention starting from the disclosure of Roth, one skilled in the art would have to disregard the teaching of Roth that the photoinitiators should be cationic photoinitiators and rather, use radical photoinitiators and, in addition, add a monofunctional (meth)acrylate, but no organic solvent or multifunctional (meth)acrylate. One skilled in the art would find nothing in Marshall that would lead them to do this. While Marshall indicates that monofunctional (meth)acrylate monomers can be used in ink-jet inks, the (meth)acrylate monomers are listed as alternatives to vinyl compounds (see column 3, lines 23-35). Thus, Marshall contains no suggestion that vinyl ethers should be used in combination with (meth)acrylate monomers. Moreover, Marshall specifically states that difunctional monomers should be included in the inks disclosed therein in order to provide a fast cure (see column 3, lines 36-50) as well as the examples of the Marshall reference. It should be noted that these also include hexanediol diacrylate. Accordingly, the Examiner's assertion that Marshall would have led one skilled in this art to use a monofunctional (meth)acrylate monomer and a radical photoinitiator finds no basis in this reference. In fact, the only disclosure which does suggest this is the present application and it is only through the

hindsight provided by the present application that can lead one to the combination asserted by the Examiner.

There is nothing in the combined disclosures of Marshall and Roth which would lead one skilled in the art to combine at least one monofunctional (meth)acrylate monomer with at least one α, β-unsaturated ether monomer in the absence of water, a volatile organic solvent and multifunctional (meth)acrylates and expect that one would obtain a ink-jet ink having a very low viscosity that is suitable for printing on porous substrates. Indeed, these documents teach away from the presently claimed invention because Roth suggests that solvents should be added to the inks disclosed therein in order to lower the viscosity and Marshall teaches that multifunctional monomers should be used in order to achieve a fast curing time. This is in complete contrast to the presently claimed invention which provides the ability to achieve a fast cure speed on porous substrates in the absence of any multifunctional (meth)acrylates. This means that a very low viscosity product can be provided in the absence of a volatile organic solvent. These claims are thus patentable over this art and this rejection should also be withdrawn.

In view of the foregoing, it is submitted that this application is in condition for allowance and favorable reconsideration and prompt Notice of Allowance are earnestly solicited.

Respectfully submitted,

Dated: November 5, 2007

By _____

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